

NO. 22-1325, -1327

**IN THE UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

APPLE INC.,
Appellant,

v.

COREPHOTONICS, LTD.,
Cross-Appellant

RESPONSE AND REPLY BRIEF OF APPELLANT APPLE INC.

**Appeals from the United States Patent and Trademark Office,
Patent Trial and Appeal Board in No. IPR2020-00878.**

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Relevant Claims of U.S. Patent No. 10,330,897 (Appx535–536)

1. A lens assembly, comprising: a plurality of lens elements arranged along an optical axis and spaced apart by respective spaces, wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less and a ratio $TTL/EFL < 1.0$, wherein the plurality of lens elements includes, in order from an object side to an image side, a first group comprising lens elements L_{1_1} , L_{1_2} and L_{1_3} with respective focal lengths f_{1_1} , f_{1_2} and f_{1_3} and a second group comprising lens elements L_{2_1} and L_{2_2} , wherein the first and second groups of lens elements are separated by a gap that is larger than twice any other gap between lens elements, wherein lens element L_{1_1} has positive refractive power and lens element L_{1_2} has negative refractive power and wherein lens elements L_{2_1} and L_{2_2} have opposite refractive powers.

2. The lens assembly of claim 1, wherein the TTL is equal or smaller than 6.0 mm and wherein the lens assembly has a f-number $F\# < 2.9$.

3. The lens assembly of claim 1, wherein the TTL is equal or smaller than 6.0 mm and wherein lens element L_{1_1} , has an image-side surface diameter between 2.3 mm and 2.5 mm.

* * * * *

5. The lens assembly of claim 1, wherein the lens assembly has a f-number $F\# < 2.9$.

* * * * *

8. The lens assembly of claim 5, wherein lens element L_{1_1} has a convex image-side surface.

* * * * *

16. The lens assembly of claim 2, wherein the lens assembly further includes a ratio between a largest optical axis thickness L_{11} and a circumferential edge thickness L_{1e} of lens element L_{11} of $L_{11}/L_{1e} < 3$.

17. A lens assembly, comprising a plurality of lens elements arranged along an optical axis and spaced apart by respective spaces, wherein the lens assembly has an effective focal length (EFL), wherein a lens system that includes the lens assembly plus a window positioned between the plurality of lens elements and an image plane has a total track length (TTL) of 6.5 millimeters or less, wherein a ratio $TTL/EFL < 1.0$, wherein the plurality of lens elements includes, in order from an object side to an image side, a first group comprising lens elements L_{1_1} , L_{1_2} and L_{1_3} with respective focal lengths f_{1_2} and f_{1_3} , and a second group comprising lens elements L_{2_1} and L_{2_2} , wherein lens element L_{1_1} has positive refractive power and lens element L_{1_2} has negative refractive power, wherein $1.2 \times |f_{1_3}| > |f_{1_2}| > 1.5 \times f_{1_1}$ and wherein lens elements L_{2_1} and L_{2_2} have opposite refractive powers.

18. The lens assembly of claim 17, wherein the TTL is equal or smaller than 6.0 mm and wherein the lens assembly has a f-number $F\# < 2.9$.

* * * * *

19. The lens assembly of claim 17, wherein the TTL is equal or smaller than 6.0 mm and wherein lens element L_{1_1} has an image-side surface diameter between 2.3 mm and 2.5 mm.

* * * * *

21. The lens assembly of claim 17, wherein the lens assembly has a f-number $F\# < 2.9$.

* * * * *

24. The lens assembly of claim 21, wherein lens element L_{1_1} has a convex image-side surface.

* * * * *

30. The lens assembly of claim 18, wherein the lens assembly further includes a ratio between a largest optical axis thickness L_{11} and a circumferential edge thickness L_{1e} of lens element L_{1_1} of $L_{11}/L_{1e} < 3$.

CERTIFICATE OF INTEREST

Case Number 22-1325, -1327

Short Case Caption Apple Inc. v. Corephotonics, Ltd.

Filing Party/Entity Apple Inc. / Appellant

Instructions: Complete each section of the form. In answering items 2 and 3, be specific as to which represented entities the answers apply; lack of specificity may result in non-compliance. **Please enter only one item per box; attach additional pages as needed and check the relevant box.** Counsel must immediately file an amended Certificate of Interest if information changes. Fed. Cir. R. 47.4(b).

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

Date: December 16, 2022

Signature: /s/ Debra J. McComas

Name: Debra J. McComas

1. Represented Entities. Fed. Cir. R. 47.4(a)(1).	2. Real Party in Interest. Fed. Cir. R. 47.4(a)(2).	3. Parent Corporations and Stockholders. Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities.	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities.
<u> </u> None/Not Applicable	<u> X </u> None/Not Applicable	<u> X </u> None/Not Applicable
Apple Inc.		

4. Legal Representatives. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

☐ None/Not Applicable

☐ Additional pages attached

Stephanie N. Sivinski (Haynes and Boone, LLP)	Jordan Maucotel (Haynes and Boone, LLP)	

5. Related Cases. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

☐ None/Not Applicable

☐ Additional pages attached

Corephotonics, Ltd. v. Apple Inc., 5:19-cv-04809 (N.D. Cal.)		

6. Organizational Victims and Bankruptcy Cases. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

☒ None/Not Applicable

☐ Additional pages attached

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STATEMENT OF RELATED CASES

No appeal in or from the same proceeding was previously before this Court or any other appellate court.

Counsel is aware that the following case may directly affect or be directly affected by this Court's decision in the pending appeal:

Corephotonics, Ltd. v. Apple Inc., No. 3:19-cv-04809-JD (N.D. Cal.).

SUMMARY OF THE ARGUMENT

Apple’s Appeal. With respect to claims 3, 8, 19 and 24, both the Board and Corephotonics improperly focus only on Ogino Example 5 and only how that example addresses the convex-image-side first-lens requirement of claims 8 and 24. The references, when properly considered in their entirety, render obvious claims 3, 8, 19, and 24 and require reversal.

With respect to claims 16 and 30, the Board improperly relied upon a theory of teaching away that even Corephotonics recognizes was never asserted or proven. Properly considered, Beich teaches the disputed limitation of claims 16 and 30.

Corephotonics Cross-Appeal. Corephotonics ignores the substantial evidence supporting the Board’s decision that the prior art renders obvious claims 2, 5, 6, 18, and 21–23. Instead Corephotonics centers its appeal on meritless arguments regarding manufacturability and the scope of Apple’s IPR reply.

First, the Board fully considered—and correctly rejected—Corephotonics’ manufacturability-related arguments, in the context of a reasonable expectation of success as well as under multiple other legal theories. Put simply, the challenged claims do not include any requirements regarding mass manufacturability, and both parties’ experts agreed that POSITAs would have designed lenses for purposes *other* than manufacturability.

Second, Corephotonics' complaint regarding the scope of Apple's reply evidence is irrelevant because the reply evidence was not necessary to the Board's findings. In any event the Board properly considered the reply evidence because it was presented in direct response to Corephotonics' arguments regarding manufacturability raised in the Patent Owner Response.

For these reasons, the Court should reverse, or at least remand, with respect to the Board's analysis of claims 3, 8, 16, 19, 24, and 30. Further, the Court should affirm with respect to claims 2, 5, 6, 18, and 21–23.

ARGUMENT

I. Corephotonics, like the Board, fails to consider relevant disclosures in the prior art and testimony in its obviousness analysis of claims 3, 8, 19 and 24.

The Board and Corephotonics' response ignore significant evidence and arguments regarding claims 3, 8, 19, and 24. Instead, they both improperly focus on the modified Ogino Example 5 in a vacuum and without regard to the evidence explaining how a POSITA's motivation to modify Ogino Example 5 in a manner that achieves the first lens diameter required by claims 3 and 19 also further results in the convex image-side first lens of claims 8 and 24. Looking at what Corephotonics' arguments omit highlights the deficiencies in the Board's obviousness analysis.

A. Corephotonics improperly discounts the impact of claims 3 and 19 on the Ground 3 obviousness analysis.

The Board erred in disregarding the evidence reflecting a POSITA's motivations to modify Ogino Example 5 to achieve the lens diameter disclosed by claims 3 and 19. Had the Board considered that evidence, it also would have understood why that change in diameter would have then rendered obvious the change to a convex image-side surface of the first lens element, as required by claims 8 and 24.

Claims 3 and 19 add only one requirement to the claims the Board found invalidated by the prior art: that the image-side surface diameter of the first lens fall “between 2.3 mm and 2.5 mm.” Appx535–536. The opening brief recites in detail the evidence explaining that a POSITA would have been motivated to lower the f-number of a lens design by making “the lens diameter larger so that more light can pass through the system.” *See, e.g.*, Apple Opening Br. 10–11, 21–22¹; *see also* Appx1112–1113 (Dr. Sasián noting “the teaching of Bareau and Wang indicating a desire for cell phone lenses with lower f-number for smaller sensors” and “the

¹ Apple Opening Br. 10–11 (citing Appx493 (Petition), Appx1112 (Sasián Decl.), Appx4442 (Patent Owner Resp.), Appx1189–1194, Figs. 8–13, Appx1686–1687, Appx2083, 1:39–42, Appx1697, Appx1112–1113 (Sasián Decl.)); *see also* Apple Opening Br. 21–22 (citing Appx487–488 (Petition) (further citing Appx1107–1108 (Sasián Decl.), Appx1189–1194 (Ogino), Appx1686–1687 (Bareau), Appx1697 (Kingslake), Appx2083, 1:39–42 (Wang))).

teachings [i]n Kingslake indicating a general desire among POSITAs to design faster lenses”).²

To summarize: Apple’s evidence explained that a POSITA seeking to lower the f-number of the Ogino Example 5 lens assembly would have looked to the other examples within Ogino to get a sense of how low of an f-number could be obtained. Appx1107–1109 (Sasián Decl.), ¶¶ 61–64, Appx1112–1113 (Sasián Decl.). The example in Ogino with the lowest f-number has an f-number of 2.45, so it would have been obvious to a POSITA to try and adapt Ogino Example 5 using an f-number of 2.45 as a target. Appx1107–1109 (Sasián Decl.), ¶¶ 61–64; *see also* Appx1148. And a well-known method to achieve a lower f-number is to increase the diameter of a lens because doing so “allows more light to pass through the system while maintaining a similar focal length.” Appx1109–1110, ¶ 65, Appx1112 (Sasián Decl.). The evidence further reflects that it was well-known to POSITAs that the commonly used Zemax software³ could be used to model an increase in the diameter

² The Board made at least some of these fact-findings in other IPRs between the same parties that are now final. For example, in IPR2020-00897 (involving the related ’277 patent), Apple explained that one way to modify a lens to lower its f-number is to increase the diameter of one or more lens elements. Appx174. The Board adopted Apple’s findings (Appx174–175), and Corephotonics dismissed its appeal.

³ The Board’s adopted definition of the relevant level of skill in the art explains that a POSITA “would have known how to use lens design software such as Code V, Oslo, or Zemax, and would have taken a lens design course.” Appx11. Accordingly, the Zemax software Dr. Sasián utilized to optimize other lens parameters when

until the desired f-number (here, 2.45) is achieved. Appx1109–1111 (Sasián Decl.), ¶¶ 65–66; *see also* Appx1112–1115 (Sasián Decl.), ¶ 68. The Zemax software will then vary the diameter and curvatures until the desired f-number is reached. All of this would have been performed according to “the well-known lens design process . . . to find an optimized modification.” Appx1108, ¶ 61 (citing Appx1840–1854 (Fischer) as describing that design process); *see also* Appx1109, ¶ 64 (again referring to the well-known lens design process “using lens design software”).

A POSITA applying this approach to Ogino’s Example 5 would have found that, “using lens design software to find the best solution,” the diameter at which the desired f-number is achieved is 2.34 mm, which falls squarely within the diameter range claimed by claims 3 and 19. Appx1109–1110, ¶ 65, Appx1113, Appx1151 (Sasián Decl.). A POSITA would have used the Zemax software to perform an automated optimization to achieve a lens that works for a 1/4-inch image sensor, which results in a convex image-side lens as claimed in claims 8 and 24. Appx1114–1115 (Sasián Decl.), Appx1148 (Sasián Decl. Appendix), Appx6121 (Sasián Reply Decl.), Apple Opening Br. 12, 22.⁴

adjusting specific parameters of emphasis was recognized by the Board as being familiar to a POSITA.

⁴ Apple Opening Br. 12, 22 (citing Appx1113 (Sasián Decl.), Appx1115 (Sasián Decl.), Appx4443 (Patent Owner Resp.), Appx 494 (Petition)). Notably, the Board criticized Apple for explaining this process for the first time at the oral hearing

Corephotonics argues there is no reason to consider the evidence related specifically to claims 3 and 19 because “the proposed modifications to the Ogino lens design are *exactly the same*” as for claims 8 and 24 and are “based on a *single* set of arguments for motivation to modify the prior art design.” CP Br. 29 (emphasis original). But while the motivation to modify the prior art design (to reduce the f-number) is the same, Apple presented additional evidence specific to claims 3 and 19 as to why that motivation would lead a POSITA to reduce the diameter to achieve that result, and then allow lens design software to optimize the resulting design.

By ignoring the evidence and arguments specific to claims 3 and 19, Corephotonics urges this Court (as it successfully and erroneously did before the Board) to overlook the step-by-step evidence regarding the proposed modification, including independently relevant evidence that should have been considered. By taking Corephotonics’ approach, the Board skipped multiple steps in the analysis and then (somewhat unsurprisingly given the skipped steps), could not understand why the shape of the lens had been modified in the analysis of claims 8 and 24. *See* Appx39. For example, the Board skips over evidence by jumping from evidence showing a desire to target a lower f-number of 2.45 straight to the ultimate change in lens shape—without ever addressing the interim steps in the analysis regarding

(Appx40 n.11), but the above-cited evidence accompanied the Petition and expressly discloses a process that results in a convex image-side first lens.

the change in diameter to 2.34 mm. *See* Appx40. A decision that blindly ignores arguments and evidence of record supporting a motivation to combine or alter the prior art in a manner that discloses the claimed invention is not a decision that is supported by substantial evidence and supports reversal, or at least vacatur, of the decision. *See Vicor Corp. v. SynQor, Inc.*, 869 F.3d 1309, 1321 (Fed. Cir. 2017).

It was error for the Board to exclude the arguments and evidence specific to claims 3 and 19 in its obviousness analysis. In determining obviousness, the operative question is whether there is any “apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *Intercontinental Great Brands LLC v. Kellogg N. Am. Co.*, 869 F.3d 1336, 1344 (Fed. Cir. 2017). That reason need not be the same motivation that inspired the inventor of the claimed invention. *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197 (Fed. Cir. 2014); *see In re Conrad*, 759 F. App’x 982, 985 (Fed. Cir. 2019) (non-precedential) (collecting cases). Rather, “[m]otivation to combine may be found in many different places and forms.” *Allergan, Inc. v. Sandoz Inc.*, 726 F.3d 1286, 1292 (Fed. Cir. 2013). And where persons of skill in the art are known to combine or modify prior art references in a way to disclose the claimed invention, obviousness applies, even where the POSITA’s initial intent for making that combination is not the same as that stated in the claimed invention. *See Nalpropion Pharms. Inc. v. Activis Labs FL, Inc.*, 934 F.3d 1344, 1354 (Fed. Cir. 2019) (finding motivation to combine known

drugs to achieve weight loss effects of claimed invention based on evidence that persons of skill in the art combined known drugs as disclosed in the claimed invention, *even without understanding how the drugs achieved the desired effect*).

Thus, Apple's arguments and evidence explaining why and how a POSITA would have made the proposed modification to Ogino Example 5 in a manner that employs the image-side lens diameter disclosed in claims 3 and 19 should have been considered by the Board. That evidence and analysis goes directly to the determination of whether a POSITA would have been motivated to modify Ogino Example 5 to achieve the lens diameter range disclosed in claims 3 and 19. And, the same arguments and evidence, viewed in light of the software-based optimization performed by Dr. Sasián, support the additional understanding of why and how the first lens would be convex (as disclosed by claims 8 and 24) upon employing the POSITA's motivations to modify the references. The error the Board made in ignoring this record evidence supports reversal or, at the very least, vacatur and remand as to claims 3, 8, 19, and 24.

Having improperly discounted (if not completely ignored) the evidence and arguments presented with respect to claims 3 and 19, Corephotonics' remaining arguments with respect to what it describes as the Ground 3 claims—claims 3, 8, 19, and 24—suffer from the same deficiencies as the Board's analysis. Namely, Corephotonics (as the Board did) looks only to selective evidence of what Ogino

alone discloses: specifically, the fact that the image side of the first lens in each of Ogino’s examples is concave rather than convex. *E.g.*, CP Br. 18–19. Its analysis ignores altogether what a POSITA would have understood (and easily accomplished) based on the POSITA’s knowledge of the state of the art as a whole. Looking through an impermissibly narrow prism, Corephotonics attempts to paint this as a simple question of substantial evidence that went unfavorably for Apple. But an obviousness analysis that ignores the rationales in the petition, the art as a whole, and the Board’s own findings elsewhere in the Final Written Decision is not supported by substantial evidence; it is incomplete and legally infirm. *See Vicor*, 869 F.3d at 1321.

Indeed, looking to the state of the art as a whole (as the Board should have done), the evidence shows that POSITAs were driven by a desire to achieve faster lenses which allow greater amounts of light, which a person of skill in the art would have understood to require lower f-numbers (specifically, f-numbers below 2.8).⁵ *E.g.*, Appx1107, ¶ 60 (discussing Appx1697 (Kingslake)) This was achieved by Dr. Sasián for Ogino Example 5 by making “the [first] lens diameter larger so that more light can pass through the system” due to the location of the aperture. Appx1112–

⁵ The specific suggestion of an f-number less than 2.8 comes from Wang, as Apple cited in its Petition. *See* Appx487–488 (citing Appx2083, 1:39–42); *see also* Apple Opening Br. 21–22. *Contra* CP Br. 17–18.

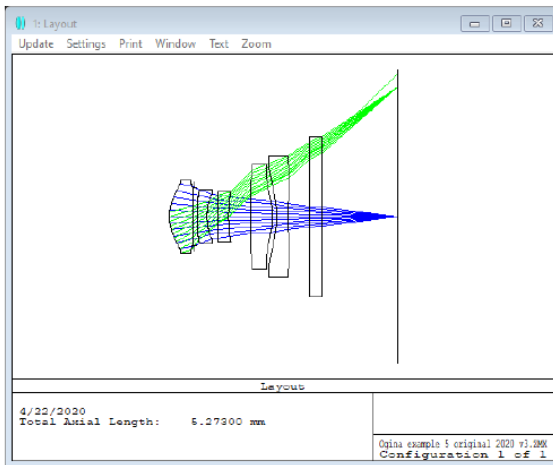
1115; *see also* Appx1148–1151. The design was optimized by the Zemax software based on the increased first lens diameter, which converted the image-side surface of the first lens from concave to convex “to better focus incoming light.” Appx1112–1115; *see also* Appx1148–1151. Applying these motivations leads a POSITA to achieve both the lens diameter disclosed by claims 3 and 19 and the convex first lens disclosed by claims 8 and 24. Appx1112–1115, Appx1148–1151. This evidence supports a finding of obviousness as to claims 3, 8, 19 and 24.

The Board reached the wrong conclusion by limiting its analysis to Ogino Example 5, disregarding the impact of its findings as to other claims, and ignoring Apple’s arguments and evidence directed to claims 3 and 19. In fact, the Board got the analysis exactly backwards. Instead of recognizing that the change in *diameter* is the critical change a POSITA would have made to achieve a lower f-number (which then results in a change in lens shape), the Board appeared to believe the change in *lens shape* was the basis for the analysis of all four claims in Ground 3. *See* Appx42 (“[B]ecause Petitioner’s proposed design with the changed lens shape is used to support its contentions as to claims 3, 8, 19, and 24, we do not find them persuasive”). As summarized in the step-by-step analysis above, that is the opposite of what Apple argued.

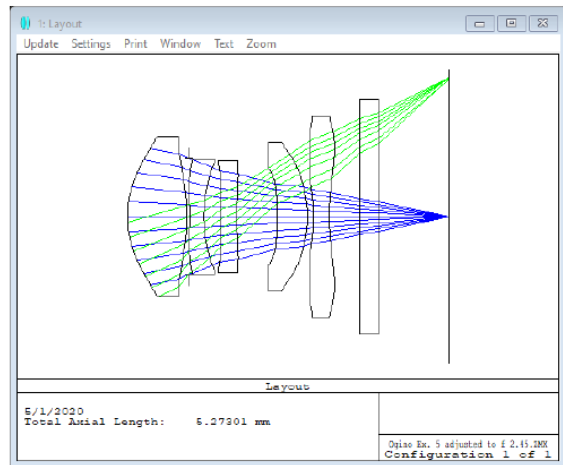
Corephotonics attempts to remedy this oversight on appeal by picking apart the evidence the Board failed to consider. *See, e.g.*, CP Br. 22–23. But these attempts

only serve to highlight the lack of analysis in the Board’s decision. For instance, Corephotonics acknowledges that, in modifying Ogino Example 5, the image-side surface of the first lens was changed from concave to convex “to allow [the first lens] to better focus incoming light” and “to provide a thicker edge for easier manufacturing.” CP Br. 22 (citing Appx495 (further citing Appx1114–1115)). But Corephotonics then criticizes this evidence as “cursory” and inadequate to answer countless irrelevant questions it poses about how that process would necessarily work. *See* CP Br. 23.

In making these arguments, Corephotonics ignores record evidence. Indeed, prior to the quoted statement, Apple’s expert declaration walks through pages of explanation with diagrams of how and why a POSITA would have taken the same steps he did to modify the prior art to achieve the universally recognized goals of faster lenses and brighter images. *See* Appx1107–1112. Applying these steps and reasoning, the evidence explains that “[m]odifying Example 5 to achieve [an f-number of] 2.45, as shown below, and using lens design software to find the best solution, a POSITA would have arrived at one possible lens design as shown below”:



Ogino Example 5 (F#=3.94)



Example 5 modified with F#=2.45

Appx1109–1110. This reveals not only a first lens image-side surface diameter between 2.3 mm and 2.5 mm (satisfying claims 3 and 19) but also a convex image-side first lens (satisfying claims 8 and 24). Appx1110.

The evidence further explained that “[t]his modified version of Example 5 uses larger lens diameter for each lens, which, as taught in Walker, is one way to lower the f-number of a lens assembly since increasing a lens’s diameter allows more light to pass through the system while maintaining a similar focal length.” Appx1110, ¶ 65. This modification of Example 5 supports the f-number of 2.45 as suggested by Ogino Example 3 “while maintaining similar performance characteristics and achieving higher relative illumination when compared to the original Example 5 design.” Appx1110, ¶ 66. This statement is, in turn, supported

by charts “comparing the field curves and relative illumination plots” of the original Ogino Example 5 with the modified version. Appx1110–1111.

It is in the context of this detailed and thorough, step-by-step explanation that Apple’s expert then explained how and why the modified Example 5 would disclose all of the Ground 3 claims, including the change of the image-side first lens from concave to convex (claims 8 and 24)—something that happens when well-known lens design software is used to find the best solution to “better focus incoming light” and “provide a thicker edge for easier manufacturing” “while maintaining [the lens’s] original focal length as much as possible.” Appx1114–1115.

In sum, because the Board failed to address the step-by-step motivation analysis Apple presented, the Court should reverse the Board’s decision as to claims 3, 8, 19 and 24. At the very least, the failure to address that evidence requires vacatur and remand.

B. The Board’s decision improperly imposes a duty on Apple to prove that the modified Ogino Example 5 is the best option.

The Board’s analysis of claims 3, 8, 19, and 24 suffers from an additional, independent flaw: it expressly faults Apple’s expert for failing to explain why the proposed change was “required to achieve these benefits *as opposed to other possible changes*.” Appx39 (emphasis added). In other words, the Board required Apple to show why the proposed modification would have been the preferred way to achieve the stated goals, which is not the correct standard. Rather, it is sufficient

to show that the proposed modification would be a suitable option to one skilled in the art. *PAR Pharm.*, 773 F.3d at 1197–98; *cf. KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”). As discussed in detail above and in Apple’s Opening Brief, Apple met this standard, and the Board’s findings to the contrary should be vacated.

Corephotonics dismisses any notion that the Board imposed a heightened requirement on Apple to show that the modified Ogino Example 5 was the “best option” rather than an option. *See* CP Br. 25–26. But this simply ignores what the Final Written Decision says. Corephotonics nowhere defends (because it cannot) the notion that Apple should have been forced to demonstrate that the proposed modification was the preferred method of reaching certain goals. This legal error alone requires at least a remand for a proper obviousness analysis.

II. The Board erred in finding Beich teaches away from its rule of thumb, which indisputably teaches the center-to-edge thickness ratio disclosed in claims 16 and 30.

Corephotonics admits that the issue of teaching away “was not properly before the Board.” *See* CP Br. 31–37. That should end the inquiry. Nevertheless, Corephotonics defends the Board’s finding that a suggested manufacturing tolerance disclosed in Beich would negate (*i.e.*, teach away from) the Beich Rule of Thumb that indisputably teaches the center-to-edge thickness ratio disclosed in claims 16

and 30. That is mistaken. As this Court already ruled in *Corephotonics, Ltd. v. Apple Inc.*, No. 20-1961, 2021 WL 4944471 (Fed. Cir. Oct. 25, 2021) (the “1961 Appeal”), “design decisions entail making tradeoffs among multiple objectives.” *Id.* at *6. The existence of other rules of thumb and/or manufacturing tolerances thus should not be read to interfere with design choice. *See PAR Pharm.*, 773 F.3d at 1197–98 (Fed. Cir. 2014) (“Our precedent, however, does not require that the motivation be the best option, only that it be a suitable option from which the prior art did not teach away.”).

Corephotonics attempts to distinguish the Court’s treatment of Beich in the *1961 Appeal* by arguing that, in that case, different rules of thumb were being applied across claim limitations. But that distinction does not explain away Beich’s express recognition that tradeoffs exist in the manufacturing process that require the designer to make choices between them.

In any event, Corephotonics does not contend that the high standard for teaching away has been met here. *See* CP Br. 37. That would have required proof by Corephotonics that Beich directly “criticize[s], discredit[s], or otherwise discourage[s] investigation into the invention claimed.” *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2014) (citing *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009)). Yet Beich not only does not discourage investigation into the claimed invention, but instead it expressly recognizes that its rules and tolerances are tradeoffs to be considered on a

case-by-case basis. *See* Apple Opening Br. 40–41 (citing *1961 Appeal*, 2021 WL 4944471 at *5); *see also* Appx1304 (Beich) (“[W]hat is not discussed here is how the rules of thumb interact with one another or how a change in one area will impact another. Rules of thumb are quick generalizations. They are useful for initial discussions, but the rules can quickly break down as the limits of size, shape, thickness, materials, and tolerances are encountered.”), Appx6111–6112 (Sasián Reply Decl.) (further citing Appx1304, Appx1306).

Other prior art references similarly recognize the constant tradeoffs between the demand for improved image quality and manufacturing tolerances. Bareau, for instance, explains that “[t]here are, of course, tradeoffs to be made between sharpness, noise levels and electronic complexity. In each case there will be added costs; it will [be] interesting to see what cost/image quality balance cell phone manufacturers finally select to offer their customers in the next generation of cell phone camera products.” Appx1694.

Far from teaching away, the prior art embraces the choices a POSITA may need to make between design rules of thumb and manufacturing tolerances. Here, Dr. Sasián articulated why a POSITA would look to Beich’s center-to-thickness ratio rule of thumb in making its design choices. Appx1120–1124. When Corephotonics challenged that explanation in its patent owner’s response by questioning the impact of manufacturability considerations on a POSITA’s choice, Dr. Sasián further

explained in reply that “[m]anufacturing considerations are preferences, and do not show that lenses cannot be physically produced.” Appx6111–6112. Further in reply to the manufacturability concerns raised in patent owner’s response, Dr. Sasián demonstrated the manufacturability of the lens design using the chosen lens thicknesses. *See* Appx6113–6115 (demonstrating manufacturability without impacting lens thickness), Appx6124–6127 (further explaining why manufacturability considerations would not impact the choice to rely on Beich’s center-to-thickness ratio rule of thumb and referring to the reasoning and analysis at Appx6113–6115 to demonstrate that “a POSITA would have had the requisite skill to design a lens system based on Chen’s Example 1 that would meet the manufacturing tolerances cited by Dr. Milster, if required.”).

There being no claim (much less any evidence) of teaching away, there is no basis to reject the straightforward evidence of a POSITA’s reasoned reliance on one rule of thumb or tolerance under Beich in favor of another. The Board’s ruling to the contrary was legal error and should be reversed.

III. The determination that claims 2, 5, 6, 18, and 21–23 are unpatentable as obvious is supported by substantial evidence, results from a thorough analysis by the Board, and should be affirmed.

The Board’s determination that claims 2, 5, 6, 18 and 21–23 are unpatentable as obvious is based on a thorough legal analysis that contemplated all timely and properly raised arguments from all parties. There is no error in the Board’s decision

that would justify reversal of the Board’s well-reasoned decision as it relates to Ground 2, and that portion of its decision should be affirmed.

A. The Board fully considered and rejected Corephonics’ arguments regarding reasonable expectation of success and supported its reasoning with substantial evidence.

The Board expressly and directly considered Corephonics’ challenge to the manufacturability of Apple’s proposed modified Ogino Example 5, including any “reasonable expectation of success” argument. Notably, the words “reasonable” and “expectation” as used in this context appear nowhere in either the patent owner’s response or sur-reply, not even in citing to the standard for obviousness. *See generally* Appx4380–4454, Appx6149–6184. The Board certainly cannot be faulted for failing to address a legal theory Corephonics never raised. *See In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (stating that under the APA, the Board’s decision should be limited to “arguments that were advanced by a party, and to which the opposing party was given a chance to respond”).

Nonetheless, while acknowledging the lack of clarity in which legal theory Corephonics intended to apply, the Board addressed the applicability of Corephonics’ manufacturability arguments under multiple possible legal theories, including reasonable expectation of success. Specifically, the Board noted,

[I]t is unclear upon which one of the following Patent Owner’s argument regarding manufacturability is based: the design proposed by Petitioner being inoperable for its intended purpose, or that there is no reasonable likelihood of success in creating a manufacturable version of the lens design offered by Petitioner, or that a person of ordinary skill in the art simply would not have been motivated to pursue designs that do not meet Beich’s rules of thumb for manufacturability.

Appx32. The Board then proceeded to make detailed findings outlining Corephotonics’ manufacturability theories and explaining the legal basis for rejecting them under each possible theory. *See* Appx29–35.

The Board began its analysis by agreeing with Corephotonics that a POSITA: (1) “would have known that the lenses in Ogino would most likely be made of injection molded plastic,” (2) “would have considered issues of manufacturability in determining the edge thickness and consider oversizing the edges of the lens to deal with this potential problem,” and (3) “would also have recognized that when designing lens elements for crafting via injection molding, a number of manufacturing realities apply that all promote maximizing the thickness of lens element at the edge.” Appx29. Nevertheless, the Board disagreed with the “import” of these manufacturing concerns to a POSITA compared to other considerations. Appx29.

The Board began by addressing reasonable expectation of success, concluding that Corephotonics’ manufacturability arguments did not raise concerns regarding a reasonable expectation of success. The Board recognized that none of the disputed

claims “include any manufacturing requirements such as center-to-edge thickness ratio.” Appx31. The Board noted that “[t]he reasonable expectation of success requirement refers to the likelihood of success in combining references to meet the limitations of the *claimed* invention.” Appx32 (FWD) (quoting *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016)). Accordingly, the Board then concluded that “[b]ecause manufacturability concerns regarding edge thickness are not claimed, a person of ordinary skill can have success in making the lens design claimed in claims 2, 5, 6, 18 and 21-23 without regard to manufacturability.” Appx32. In short, to the extent Corephotonics’ arguments could have been construed as challenging whether a POSITA would have had a reasonable expectation of success in making the combination, the Board addressed and rejected that argument.

The Board further addressed Corephotonics’ same arguments regarding manufacturability, in light of Corephotonics’ “unclear” legal theory underlying its arguments. Appx32. Viewing the argument as one of inoperability for its intended purpose, the Board similarly rejected Corephotonics’ manufacturability concerns by explaining that “a modification to a prior art reference that results in the loss of key functionality can be overcome by evidence that a person of ordinary skill would nevertheless have been motivated to combine references.” Appx33 (citing *In re Urbanski*, 809 F.3d 1237, 1244 (Fed. Cir. 2016)). The Board then found that Apple

had demonstrated such a motivation, crediting Apple’s evidence that a POSITA “would have been motivated to make lenses for experimental or research purposes that to do [sic] require manufacturing tolerances for edge thickness.” Appx33 (citing Appx5336–5337 (Reply) (citing Appx6108–6109, ¶¶ 16, 17 and Appx5538, 182:17–20, 182:9)).⁶

While Corephotonics now disputes that finding regarding experimental or research purposes, neither of its cursory arguments can dislodge the substantial evidence supporting the Board’s finding. Though Corephotonics states that it “presented extensive evidence showing that there was no reasonable expectation of successful fabrication ‘*using any technique*,’” the quoted argument is still focused on manufacturability. CP Br. 45 (quoting Appx6154). There, Corephotonics argued that Apple’s proposed combination could not be made “using any technique *for lens manufacture*, whether it be injection molding of plastic, injection molding of glass, grinding or polishing of glass, diamond turning, or any other technology.” Appx6154 (Sur-Reply) (emphasis altered and internal citations omitted). Corephotonics’ argument was focused on manufacturability—not on whether a POSITA would have made lenses for “experimental or research purposes.” Appx33. Thus, Corephotonics has not identified any evidence to contradict the Board’s finding that a POSITA

⁶ The cited page contained a typographical error, as the Board noted. See Appx33 n.8. The correct citations are included here.

“would have been motivated to make lenses for experimental or research purposes that to do [sic] require manufacturing tolerances for edge thickness.” Appx33.

Corephotonics further disputes this finding by contending that the testimony of Apple’s expert, which the Board credited, does not address a reasonable expectation of success, but instead addresses only a motivation. CP Br. 45–46 (discussing Appx6108–6109, ¶¶ 16–17). But the premise underlying Corephotonics’ reasonable expectation of success argument is that the proposed design could not be manufactured, and Dr. Sasián’s testimony makes clear that manufacturability is completely irrelevant in other contexts in which a POSITA would be motivated to design lenses, such as for such “experimental purposes.” Appx6108, ¶ 16; *see also id.* (“These lens designs would not have been subject to the rigorous design requirements of mass-produced injection molding”). The cited testimony also demonstrates Dr. Sasián’s agreement with Corephotonics’ expert’s statement during deposition that POSITAs *do* design lenses for purposes other than manufacturing. Appx6108–6109, ¶ 17 (quoting and discussing Appx5538, 182:17–20, 182:9).⁷ In short, Dr. Sasián did not need to establish the manufacturability bounds of the proposed combination because both experts agreed that POSITAs design lenses for non-manufacturability contexts.

⁷ The same typographical error noted by the Board elsewhere appears here. *See* Appx33 n.8. The correct citations are included here.

Thus, Corephotonics is incorrect to contend that “[t]he Board’s decision fails to acknowledge, let alone properly address” Corephotonics’ arguments regarding the manufacturability of the design. CP Br. 44, 46. The Board directly addressed Corephotonics’ arguments—viewing them as reasonable expectation of success arguments and otherwise—and properly rejected them based on the record evidence.

B. The Board properly considered Apple’s evidence presented in response to Corephotonics’ arguments in its Patent Owner Response.

Corephotonics’ only other challenge to the Board’s findings regarding claims 2, 5, 6, 8, and 21–23 is that Apple allegedly relied on a “new lens design” in its reply. CP Br. 47–49. The Court should reject this argument for two reasons.

First, the disputed evidence is wholly unnecessary to sustaining the Board’s decision because the evidence addresses Corephotonics’ same manufacturability arguments discussed above. Only *after* the Board rejected those manufacturability arguments did the Board note that “[a]dditionally, Petitioner presents an alternative lens design to show that one of ordinary skill would have been able to create a device that was operable.” Appx34 (citing Appx5342–5344 (Reply) (citing Appx6113–6115, ¶¶ 24–26)). And that is exactly how Apple presented the evidence: after first reiterating that the ’897 patent does not require mass manufacturing of its lenses, Apple further argued that “[h]owever, if a POSITA were to design with the specific further objective to have a lens suitable for such manufacturing, the POSITA had the

requisite skill to do so (which still would have met all the limitations of the '897 patent).” Appx5342 (Reply). Thus, the Court need not reach this argument because the Board’s findings are fully substantiated without even looking to this additional evidence.

Second, even if this additional evidence had been necessary to the Board’s findings, the Board did not abuse its discretion by considering that evidence because Apple submitted the evidence in direct response to Corephotonics’ manufacturability arguments. This Court’s case law makes clear that “the petitioner in an inter partes review proceeding may introduce new evidence after the petition stage if the evidence is a legitimate reply to evidence introduced by the patent owner.” *Anacor Pharms., Inc. v. Iancu*, 889 F.3d 1372, 1380 (Fed. Cir. 2018); *see also Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 705 (Fed. Cir. 2020) (“[A]ny ambiguity as to whether [petitioner] raised a new argument on reply is eliminated when we consider whether [petitioner’s] reply arguments are responsive to arguments raised in [the] Patent Owner Response.”); *Valmont Indus., Inc. v. Lindsay Corp.*, 730 F. App’x 918, 922–23 (Fed. Cir. 2018) (non-precedential) (“Our case law makes clear that a petitioner may submit additional evidence in the reply in response to the patent owner response.”).

To respond to Corephotonics’ contention that a POSITA could not have manufactured Apple’s proposed lens design, Apple presented an additional example

of a lens design that continues to meet the same required limitations of the '897 patent claims while also taking into account the manufacturability issues raised by Corephotonics. Appx5342–5345 (Reply). Apple explained that “the modified lens design has a first lens with low center-to-edge thickness, which addresses Patent Owner’s manufacturing concerns regarding alternative 1, while still meeting the limitations of claims 2, 5, 6, 18, and 21-23.” Appx5343 (discussing Appx6114, ¶ 25). Thus, through this additional evidence, Apple simply confirmed that, *if* a POSITA had a goal of mass manufacturing lenses, a POSITA could have done so without altering any of the elements of the originally proposed lens that addressed the limitations of the '897 patent claims. Not only was this evidence proper reply evidence, Corephotonics had an opportunity to address that evidence through its Sur-Reply (as the Board noted). *See* Appx34–35. Corephotonics likewise could have moved to strike that reply evidence and argument as improper, per the procedures provided in the Board’s Trial Practice Guide, but Corephotonics did not do so. *See* Consolidated Trial Practice Guide (Nov. 2019), 80–81.⁸ Thus, Corephotonics has forfeited this procedural argument as well.

In sum, the Court should reject Corephotonics’ argument regarding this reply evidence because that evidence is not necessary to affirm the Board’s findings and,

⁸ The Board’s Consolidated Trial Practice Guide (Nov. 2019) is available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

in any event, the evidence was properly presented by Apple in direct response to Corephotonics' arguments and without any change to the limitation-by-limitation mapping presented in Apple's petition.

CONCLUSION

For the foregoing reasons and those addressed in more detail in Apple's opening brief, Apple urges the Court to reverse the Final Written Decision in IPR2020-1325 as to claims 3, 8, 16, 19, 24 and 30 and render judgment that the challenged claims are unpatentable as obvious. Alternatively, Apple urges the Court to vacate the Final Written Decision with respect to claims 3, 8, 16, 19, 24 and 30 and remand for further consideration of the full set of evidence and under the proper legal standards for obviousness.

Apple further urges the Court to affirm the Board's unpatentability determinations as to claims 2, 5, 6, 18, and 21–23 and requests such further relief to which it may be entitled.

Respectfully Submitted,

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